

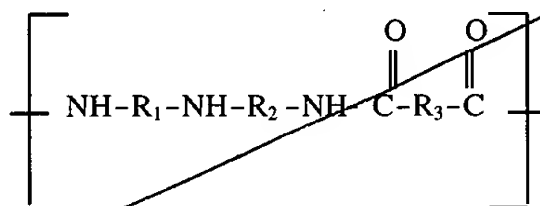
We Claim:

Sub B2
1. A creping adhesive comprising an organic polymer having in the polymer backbone amine groups selected from primary and secondary amine groups and mixtures thereof and a crosslinking agent for crosslinking the polymer to the fibrous web, said agent being selected from zirconium compounds wherein the zirconium has a valency of plus four.

2. An adhesive composition as claimed in claim 1 characterized in that the organic polymer is selected from chitosan, polyvinylamine, polyvinyl alcohol-vinyl amine and polyaminoamide.

Sub C7
3. An adhesive composition as claimed in claim 1 or claim 2 characterized in that the crosslinking agent is a zirconium compound selected from ammonium zirconium carbonate, zirconium acetylacetonate, zirconium acetate, zirconium carbonate, zirconium sulfate, zirconium phosphate, potassium zirconium carbonate, zirconium sodium phosphate and sodium zirconium tartrate.

Sub B3
4. An adhesive composition as claimed in claim 3 characterized in that the organic polymer is selected from polyvinyl alcohol-vinyl amine copolymers of the following structure:



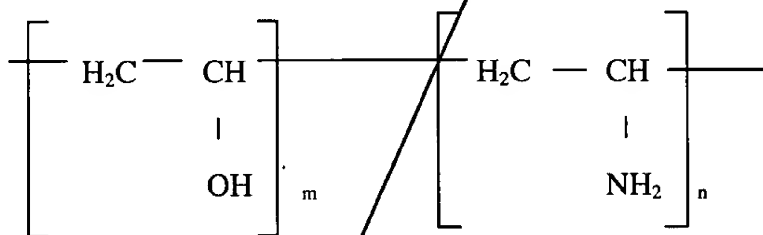
wherein m and n have values of 1 to 99 and 99 to 1 respectively.

Sub C9
5. The creping adhesive of claim 4 wherein m and n have values of 1 to 99 and 2 to 20 respectively.

6. A process for the manufacture of creping adhesives on the drying structure of paper drying machines comprising charging to the heated drying surface at about the same time but from separate sources organic polymers having in the polymer backbone amine groups selected from primary and secondary amine groups and mixtures thereof and a crosslinking

agent for crosslinking the polymer to the fibrous web said agent being selected from zirconium compounds having a value of plus four.

7. The process of claim 6 wherein the drying machine is a Yankee.
8. The process of claim 6 or claim 7 characterized in that the organic polymer is selected from chitosan, polyvinylamine, polyvinylalcohol-vinylamine and polyaminoamide.
9. The process of claim 8 characterized in that the organic polymer is selected from polyvinyl alcohol-vinylamine copolymers of the following structure:



wherein m and n have values of 1 to 99 and 99 to 1 respectively.

10. The process of claim 9 wherein m and n have values of 1 to 99 and 2 to 20 respectively.
11. The process of claim 9 wherein the organic polymer is dissolved in water wherein the liquid component is about 98 to 99% by weight of the total mixture.
12. The process of claim 6 wherein the weight ratio of the zirconium containing crosslinking agent to the organic polymer is about 4:1.
13. The process of claim 6 wherein the weight ratio of the zirconium containing crosslinking agent to the organic polymer is about 0.05:1 to about 2:1.
14. The process of claim 6 wherein the total solid content of the organic polymer and the zirconium compound crosslinking agent is kept in the range of about 0.01 to 0.5 percent by weight based on the total weight of the fiber.
15. The process of claim 14 wherein the total solid content of the organic polymer and the zirconium compound crosslinking agent is kept in the range of about 0.03 to 0.2 percent by weight based on the total weight of the fiber.
16. The adhesive of claim 1 or claim 2 applied in the range of about 0.1 to 0.8 pounds of the adhesive for each ton of cellulose fiber in the presence of a softener/debinder applied in the range of about one (1) to ten (10) pounds per ton of cellulosic fiber wherein the

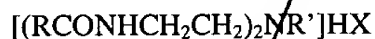
treated fiber exhibits a peel force of about 300 to 500 grams per 12 inches when measured on a paper machine having a speed of less than one hundred fifty feet per minute.

17. The adhesive of claim 16 wherein the softener/debonder is selected from the group consisting of imidazolines, amido amine salts, linear amido amines, tetravalent ammonium salts, and mixtures thereof.

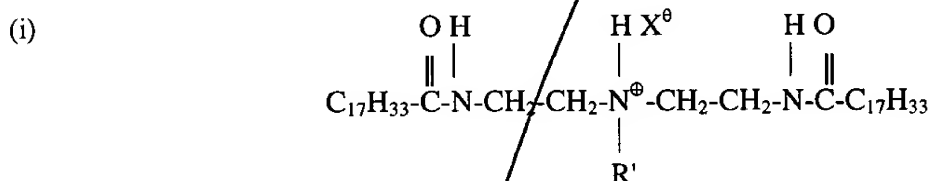
18. The adhesives of claim 17 wherein the softener has the following structure:



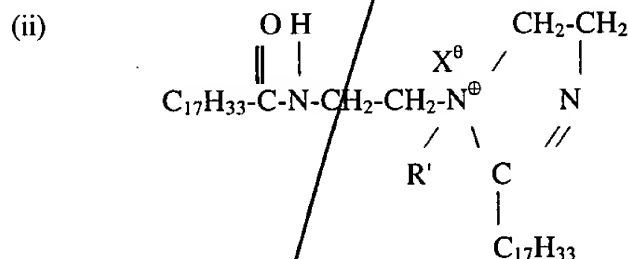
19. The adhesive of claim 16 wherein the softener has the following structure:



20. The adhesive of claim 17 wherein the softener/debonder is a mixture of linear amido amines and imidazolines of the following structure:



and



wherein X is an anion.

21. The creping adhesive manufactured by the process of claim 6.

22. The creping adhesive manufactured by the process of claim 8.

23. The creping adhesive manufactured by the process of claim 9.

24. The creping adhesive manufactured by the process of claim 11 or claim 12.

25. The creping adhesive manufactured by the process of claim 13 or claim 14.